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Terms	Documents
L1 same ((increas\$3 or decreas\$3) same (process\$3 near3 activity))	61

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<u>L3</u>	L1 same ((increas\$3 or decreas\$3) same (process\$3 near3 activity))	61	<u>L3</u>
<u>L2</u>	L1 and ((increas\$3 or decreas\$3) same (process\$3 near3 activity))	116	<u>L2</u>
<u>L1</u>	monitor\$3 near10 (process\$3 near3 activity)	1227	<u>L1</u>

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L4    L3

0    L4

*DB=PGPB,USPT,USOC; PLUR=YES; OP=OR*

L3    L1 same ((increas\$3 or decreas\$3) same (process\$3 near3 activity))

61    L3

L2    L1 and ((increas\$3 or decreas\$3) same (process\$3 near3 activity))

116    L2

L1    monitor\$3 near10 (process\$3 near3 activity)

1227    L1

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Terms	Documents
(361/323  361/683  307/60  340/636  713/320  713/321  713/322  713/323  713/501  713/600  713/300).ccls.	7098

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7098    L5

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L4    L3

0    L4

DB=PGPB,USPT,USOC; PLUR=YES; OP=OR

L3    L1 same ((increas\$3 or decreas\$3) same (process\$3 near3 activity))

61    L3

L2    L1 and ((increas\$3 or decreas\$3) same (process\$3 near3 activity))

116    L2

L1    monitor\$3 near10 (process\$3 near3 activity)

1227    L1

END OF SEARCH HISTORY

## Refine Search

### Search Results -

Terms	Documents
L3 and L5	9

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Search:

L6

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L6   13 and L5

9   L6

L5   713/320-323,501,600,300;361/323,683;340/636;307/60.ccls.

7098   L5

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L4   L3

0   L4

*DB=PGPB,USPT,USOC; PLUR=YES; OP=OR*

L3   L1 same ((increas\$3 or decreas\$3) same (process\$3 near3 activity))

61   L3

L2   L1 and ((increas\$3 or decreas\$3) same (process\$3 near3 activity))

116   L2

L1   monitor\$3 near10 (process\$3 near3 activity)

1227   L1

END OF SEARCH HISTORY

EAST - [Untitled1:1]

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	Type	L #	Hits	Search Text	DBs	Time Stamp	Comments	Error Definition	Err
1	BRS	L1	201	monitor\$3 near10 (processor near2 activity)	USPAT	2004/11/03 15:24			
2	BRS	L2	13	11 same ((increas\$3 or decreas\$3) same (processor	USPAT	2004/11/03 15:25			

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EAST - [Untitled1]

EAST - [Untitled1:1]

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l1 same ((increas\$3 or decreas\$3) same (processor near2 activity))

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	U	I	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
1	<input type="checkbox"/>	<input type="checkbox"/>	US 6681247 B1	20040120	22	Collaborator discovery method and system	709/217	707/10; 707/5;
2	<input type="checkbox"/>	<input type="checkbox"/>	US 6636976 B1	20031021	13	Mechanism to control di/dt for a microprocessor	713/320	
3	<input type="checkbox"/>	<input type="checkbox"/>	US 6442652 B1	20020827	7	Load based cache control for satellite based CPUs	711/138	455/12.1; 711/154;
4	<input type="checkbox"/>	<input type="checkbox"/>	US 6105053 A	20000815	39	Operating system for a non-uniform memory access	718/105	718/102
5	<input type="checkbox"/>	<input type="checkbox"/>	US 5926053 A	19990720	30	Selectable clock generation mode	327/298	327/150; 327/159;
6	<input type="checkbox"/>	<input type="checkbox"/>	US 5815693 A	19980929	30	Processor having a frequency modulated core clock based	713/501	713/601
7	<input type="checkbox"/>	<input type="checkbox"/>	US 5815692 A	19980929	30	Distributed clock generator	713/501	
8	<input type="checkbox"/>	<input type="checkbox"/>	US 5809293 A	19980915	13	System and method for program execution tracing	712/227	712/233
9	<input type="checkbox"/>	<input type="checkbox"/>	US 5740410 A	19980414	25	Static clock generator	713/501	327/113
10	<input type="checkbox"/>	<input type="checkbox"/>	US 5632038 A	19970520	10	Secondary cache system for portable computer	713/324	711/144; 711/145
11	<input type="checkbox"/>	<input type="checkbox"/>	US 5506945 A	19960409	9	Use of "pipes" for the transfer of status	358/1.15	358/1.14; 358/1.16

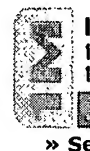
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### Results Key:

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#### 1 Improving the data cache performance of multiprocessor operating systems

*Chun Xia; Torrellas, J.;*

High-Performance Computer Architecture, 1996. Proceedings. Second International Symposium on , 3-7 Feb. 1996

Pages:85 - 94

[\[Abstract\]](#)   [\[PDF Full-Text \(1084 KB\)\]](#)   IEEE CNF

#### 2 Hardware evaluation of low power communication mechanisms for transport-triggered architectures

*Pionteck, T.; Garcia, A.; Kabulepa, L.D.; Glesner, M.;*

Rapid Systems Prototyping, 2003. Proceedings. 14th IEEE International Workshop on , 9-11 June 2003

Pages:141 - 147

[\[Abstract\]](#)   [\[PDF Full-Text \(303 KB\)\]](#)   IEEE CNF

#### 3 Design verification of a super-scalar RISC processor

*Turumella, B.; Kabakibo, A.; Bogadi, M.; Menon, K.; Thusoo, S.; Nguyen, L.; Saxena, N.; Chow, M.;*

Fault-Tolerant Computing, 1995. FTCS-25. Digest of Papers., Twenty-Fifth International Symposium on , 27-30 June 1995

Pages:472 - 477

[\[Abstract\]](#)   [\[PDF Full-Text \(468 KB\)\]](#)   IEEE CNF



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## Hardware evaluation of low power communication mechanisms for transport-triggered architectures

Pionteck, T. Garcia, A. Kabulepa, L.D. Glesner, M.

Inst. of Microelectron. Syst., Darmstadt Univ. of Technol., Germany

 This paper appears in: **Rapid Systems Prototyping, 2003. Proceedings. 1 International Workshop on**

Publication Date: 9-11 June 2003

On page(s): 141 - 147

ISSN: 1074-6005

Number of Pages: xii+242

Inspec Accession Number: 7816888

### Abstract:

The requirement for flexibility in IP-based designs **increases** the attractiveness of transport-triggered architectures as a suitable alternative to classic operation-**processors**. Since the performance of these architectures strongly depends on the communication mechanism, the optimization of the bus structure represents a design concern. In this work, a rapid prototyping methodology is employed to compare the power consumption and hardware requirements of several communication alternatives. Therefore, a generic test **processor** has been ported onto an FPGA. By **monitoring** the switching **activity** and bus statistics under operation conditions, a fast and accurate evaluation of different bus coding schemes has been achieved.

### Index Terms:

computer architecture field programmable gate arrays performance evaluation system architecture FPGA IP-based design architecture performance bus coding bus statistics bus structure optimization field programmable gate array flexibility requirement generic test processor prototype hardware evaluation hardware requirement low power communication mechanism operation-triggered processor power consumption processor design rapid prototyping methodology switching activity monitoring transport-triggered architecture

### Documents that cite this document

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## Hit List

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☐ 1. Document ID: US 20030229816 A1

Using default format because multiple data bases are involved.

L6: Entry 1 of 9

File: PGPB

Dec 11, 2003

PGPUB-DOCUMENT-NUMBER: 20030229816  
 PGPUB-FILING-TYPE: new  
 DOCUMENT-IDENTIFIER: US 20030229816 A1

TITLE: Clock control arrangement for a computing system, power management system and processing unit including the same

PUBLICATION-DATE: December 11, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Meynard, Olivier	Vizille		FR	

US-CL-CURRENT: 713/600

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KMC	Drawings
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☐ 2. Document ID: US 20030126478 A1

L6: Entry 2 of 9

File: PGPB

Jul 3, 2003

PGPUB-DOCUMENT-NUMBER: 20030126478  
 PGPUB-FILING-TYPE: new  
 DOCUMENT-IDENTIFIER: US 20030126478 A1

TITLE: Multiple mode power throttle mechanism

PUBLICATION-DATE: July 3, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Burns, James S.	Los Altos	CA	US	
Rusu, Stefan	Sunnyvale	CA	US	
Ayers, David J.	Fremont	CA	US	
Grochowski, Edward T.	San Jose	CA	US	
Eng, Marsha	Sunnyvale	CA	US	
Tiwari, Vivek	San Jose	CA	US	

US-CL-CURRENT: 713/300

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw D
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☐ 3. Document ID: US 20020007463 A1

L6: Entry 3 of 9

File: PGPB

Jan 17, 2002

PGPUB-DOCUMENT-NUMBER: 20020007463

PGPUB-FILING-TYPE: new

DOCUMENT-IDENTIFIER: US 20020007463 A1

TITLE: Power on demand and workload management system and method

PUBLICATION-DATE: January 17, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Fung, Henry T.	San Jose	CA	US	

US-CL-CURRENT: 713/320

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw D
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☐ 4. Document ID: US 6636976 B1

L6: Entry 4 of 9

File: USPT

Oct 21, 2003

US-PAT-NO: 6636976

DOCUMENT-IDENTIFIER: US 6636976 B1

TITLE: Mechanism to control di/dt for a microprocessor

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw D
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☐ 5. Document ID: US 5926053 A

L6: Entry 5 of 9

File: USPT

Jul 20, 1999

US-PAT-NO: 5926053

DOCUMENT-IDENTIFIER: US 5926053 A

TITLE: Selectable clock generation mode

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Draw D
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☐ 6. Document ID: US 5815693 A

L6: Entry 6 of 9

File: USPT

Sep 29, 1998

US-PAT-NO: 5815693  
DOCUMENT-IDENTIFIER: US 5815693 A

TITLE: Processor having a frequency modulated core clock based on the criticality of program activity

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Drawings
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☐ 7. Document ID: US 5815692 A

L6: Entry 7 of 9

File: USPT

Sep 29, 1998

US-PAT-NO: 5815692  
DOCUMENT-IDENTIFIER: US 5815692 A

TITLE: Distributed clock generator

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Drawings
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☐ 8. Document ID: US 5740410 A

L6: Entry 8 of 9

File: USPT

Apr 14, 1998

US-PAT-NO: 5740410  
DOCUMENT-IDENTIFIER: US 5740410 A

TITLE: Static clock generator

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Drawings
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☐ 9. Document ID: US 4670837 A

L6: Entry 9 of 9

File: USPT

Jun 2, 1987

US-PAT-NO: 4670837  
DOCUMENT-IDENTIFIER: US 4670837 A  
\*\* See image for Certificate of Correction \*\*

TITLE: Electrical system having variable-frequency clock

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments	Claims	KWIC	Drawings
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Terms	Documents
L3 and L5	9



US005926053A

# United States Patent [19]

McDermott et al.

[11] Patent Number: 5,926,053

[45] Date of Patent: Jul. 20, 1999

## [54] SELECTABLE CLOCK GENERATION MODE

[75] Inventors: Mark W. McDermott, Austin, Tex.;  
Antone L. Fourcroy, Fort Collins,  
Colo.

[73] Assignee: National Semiconductor Corporation,  
Santa Clara, Calif.

[21] Appl. No.: 08/972,813

[22] Filed: Dec. 15, 1998

[51] Int. Cl.<sup>4</sup> G06F 1/06

[52] U.S. Cl. 327/298; 327/291; 327/150;

327/159; 395/556; 395/558

[58] Field of Search 327/291, 298,  
327/147, 149, 150, 153, 156, 158, 159,  
161; 395/556, 558

## [56] References Cited

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5,475,224 12/1995 Iimiyari 327/59  
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### FOREIGN PATENT DOCUMENTS

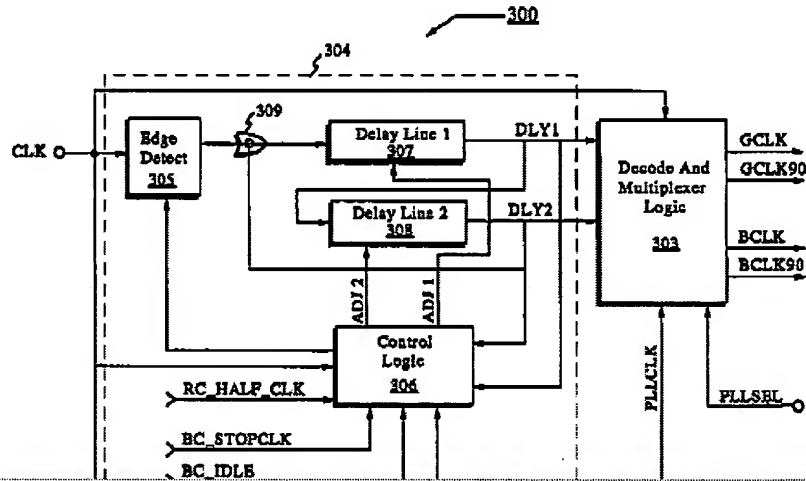
248836 2/1990 Japan 327/69  
3238913 10/1991 Japan 327/99  
5268020 10/1993 Japan 327/99

Primary Examiner—Tuan T. Lan  
Attorney, Agent, or Firm—John L. Maxin

## [57] ABSTRACT

A processing system includes circuitry and methodology for selecting clock generation modes between phase-locked loop and static delay line loop circuitries. The mode may be selectable through an externally accessible pin, an internal bond wire option, a boundary test scan control point, or other programmable register or control point.

14 Claims, 18 Drawing Sheets





US005815693A

**United States Patent** [19]

McDermott et al.

[11] Patent Number: **5,815,693**[45] Date of Patent: **\*Sep. 29, 1998**[54] **PROCESSOR HAVING A FREQUENCY MODULATED CORE CLOCK BASED ON THE CRITICALITY OF PROGRAM ACTIVITY**[75] Inventors: Mark W. McDermott, Austin, Tex.;  
Antone L. Fourcroy, Fort Collins,  
Colo.[73] Assignee: National Semiconductor Corporation,  
Santa Clara, Calif.

[\*] Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

[21] Appl. No.: 572,994

[22] Filed: Dec. 15, 1998

[51] Int. Cl.<sup>7</sup> G06F 1/04; G06F 1/08

[52] U.S. Cl. 395/556; 395/560

[58] Field of Search 395/556, 559,  
395/560, 750, 555, 750.04

## [56] References Cited

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5,167,024	11/1992	Smith et al.	395/375
5,473,767	12/1995	Kardach et al.	395/550
5,493,684	2/1996	Gephart et al.	395/750

## FOREIGN PATENT DOCUMENTS

0 368 144	5/1990	European Pat. Off.	G06F 1/32
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Primary Examiner—Dennis M. Butler  
 Attorney, Agent, or Firm—John L. Maxim

## [57] ABSTRACT

A processing system includes a clock synchronism that receives indicia of critical activity from various functional units within the processing system and responsive to the indicia, ratchets down/up the frequency of a clock output signal to at least one of the functional units to reduce power consumption. The determination of critical activity is preferably made according to a heuristic internal to a processor under software or hardware control.

3 Claims, 18 Drawing Sheets

